

Listing of CLAIMS

1. (Currently amended): A method of joining workpieces comprising:

- a) providing a first thermoplastic workpiece comprising a first surface, the first thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof;
- ab) creating a first surface diffusion zone containing therein a first polymerizable material, wherein said first surface diffusion zone is adjacent to a first surface of a first workpiece and is within said first workpiece; and, comprising a first polymerizable material within the first thermoplastic workpiece adjacent to the first surface;
- c) removing any non-absorbed excess of said first polymerizable material from said and drying the first surface; and,
- d) providing a second thermoplastic workpiece comprising a second surface, the first thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof;
- be) creating a second surface diffusion zone containing therein a second polymerizable material, wherein said second surface diffusion zone is adjacent to a second surface of a second workpiece and is within said second workpiece; and, comprising a second polymerizable material within the second thermoplastic workpiece adjacent to the second surface;

f) removing any non-absorbed ~~excess of said~~ second polymerizable material from
said and drying the second surface, and

_____ wherein said first polymerizable material and said second polymerizable material
are capable of bonding with each other; and,

eg) bringing said the first surface and said second surface into intimate contact at
a bonding surface interface; and,

dh) causing said the first polymerizable material and said the second
polymerizable material to react and join across said the bonding surface interface.

**2. (Currently amended): A The method of joining as in claim 1 wherein at least one of said
the first surface or said the second surface has at least one microfeature formed therein.**

3. (Canceled)

4. (Canceled)

**5. (Currently amended): A The method of joining as in claim [[4]]1 wherein said the first
workpiece and said the second workpiece are polyphenylenes and said the first polymerizable
material and second polymerizable material are mixtures of styrene and divinylbenzene.**

**6. (Currently amended): A The method of joining as in claim 5 wherein both of said the
mixtures have a ratio of approximately 9:1 by volume of styrene to divinylbenzene.**

7. (Currently amended): A method of joining workpieces comprising:

- a) creating a first surface diffusion zone containing therein a polymerizable material within a first thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof, wherein said the first surface diffusion zone is adjacent to a first joining surface of [[a]]the first thermoplastic workpiece and is within said workpiece and
- b) removing any non-absorbed excess of said polymerizable material from said and drying the first joining surface; and,
- bc) providing a second thermoplastic workpiece having a second joining surface, the second thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof; and,
- cd) bringing said the first joining surface and said the second joining surface into intimate contact at a bonding surface interface; and,
- de) causing said the polymerizable material to react and join across said the bonding surface interface thereby joining the first and second thermoplastic workpieces.

8. (Currently amended): A The method of joining as in claim 7 wherein at least one of said the first joining surface or said the second joining surface has includes at least one microfeature formed therein.

9. (Canceled).

10. (Canceled)

11. (Currently amended): A The method of joining as in claim [[10]]7 wherein said the first workpiece is a polyphenylene, said wherein the second workpiece is a polyetherimide and said wherein the polymerizable material is styrene.

12. – 21. (Canceled).

22. (Currently amended): A method of fabricating a microfluidic device comprising:

creating a first surface diffusion zone containing therein a first polymerizable material, wherein said first surface diffusion zone is adjacent to a first surface of a first workpiece and is within said first workpiece; and, within and adjacent to a first surface of a first thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof;

removing any non-absorbed excess of said first polymerizable material from said and drying the first surface; and,

creating a second surface diffusion zone containing therein a second polymerizable material, wherein said second surface diffusion zone is adjacent to a second surface of a second workpiece and is within said second workpiece; and, within and adjacent to a second surface of a second thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof;

removing any non-absorbed ~~excess of said~~ second polymerizable material from
said and drying the second surface; and,

wherein said the first polymerizable material and said the second polymerizable
material are capable of bonding with each other; and,

wherein at least one of said the first surface and said the second surface has
surfaces have one or more microfluidic features formed therein; and,

bringing said the first surface and said the second surface surfaces into intimate
contact at a bonding surface interface so as to form a microfluidic device; and,

causing said the first polymerizable material and said the second polymerizable
material to react and join across said the bonding surface interface, creating thereby a
microfluidic device.

23. (Currently amended): A method of fabricating a microfluidic device comprising:

creating a first surface diffusion zone containing therein a first polymerizable
material, wherein said first surface diffusion zone is adjacent to a first surface of a first
workpiece and is within said first workpiece; and, within and adjacent to a first joining
surface of a first thermoplastic workpiece selected from the group consisting of
polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones,
and derivatives and substituents thereof;

removing any non-absorbed ~~excess of said~~ first polymerizable material from said
and drying the first joining surface; and,

providing a second thermoplastic workpiece having a second joining surface, the second thermoplastic workpiece selected from the group consisting of polyimides, polyetherketones, polyetherimides, polyphenylenes, polyether-ether-ketones, and derivatives and substituents thereof; and,

wherein at least one of said the first joining surface and said second joining surface has surfaces comprise one or more microfluidic features formed therein; and,

bringing said first joining surface and said joining second surface the first and second joining surfaces into intimate contact at a bonding surface interface so as to form a microfluidic device; and,

causing said the polymerizable material to react and join across said the bonding surface interface, creating thereby a microfluidic device.

24. (Cancelled)

25. (New): The method of claim **24** wherein the first and second thermoplastic workpieces are polyphenylenes and the first and second polymerizable materials are mixtures of styrene and divinylbenzene.

26. (New): The method of claim **25** wherein the mixtures have a ratio of approximately 9:1 by volume of styrene to divinylbenzene.

27. (New): The method of claim **23** wherein the first workpiece is a polyphenylene wherein the second workpiece is a polyetherimide and wherein the polymerizable material is styrene.